REMARKS

The application identified above has been amended in response to the Office Action dated March 13, 2002. Claims 1 and 24 have respectively been amended to further emphasize patentably distinguishing features of the invention, as well as to provide Applicants with the full scope of protection to which they deem their invention entitled.

Claims 3, 4, 6, 8-12, 14, 16, 17, 22 and 23 have respectively been amended to read with enhanced clarity and definitness, and to overcome a rejection under 35 USC § 112, second paragraph. More particularly, these claims have been amended to eliminate multiple dependencies.

Claim 2 has been cancelled.

Claims 5, 7, 13, 15, 18-21 and 25 remain in their respective original forms.

In accordance with 37 C.F.R. 1.121, each of the claims now pending in the application is shown in clean form in Exhibit A, attached hereto.

In the Office Action the Examiner rejected Applicants' claims under 35 USC § 102(e), as being anticipated by U.S. Patent No. 5,936,965 to Doshi et al.; U.S. Patent No. 6,236,647 to Amalfitano; U.S. Patent No. 6,307,867 to Roobol et al.; and U.S. Patent No. 6,256,300 to Ahmed et al. Applicants' claims were rejected under 35 USC § 103 as being obvious in view of a combination of documents RFC 1547 and RFC 1663.

An important purpose of Applicants, in making their invention, is to improve data processing efficiency on the receiving side in a data packet transmission arrangement. More particularly, as stated in the application at page 7, lines 18-24, objects of the

invention include reducing the memory space requirement on the receiving side, and thereby reducing long delay times. The application at page 8, lines 5-9 teaches that these objects may be achieved, according to the invention, by directly releasing a higher-level packet of received data from a given protocol layer to the protocol layer on top thereof, as soon as the higher-level packet is completely generated at the given layer from received lower-level data packets.

The present invention solves the delay problem in the following way. At the transmitter side information about assigned data flow is added to every data packet on a first layer, which can be the transport layer. The data packets are released to a second underlying layer, which can be the network layer. The second protocol layer thus receives a byte flow from the above-lying layer. The byte flow is segmented and packaged into smaller data packets, so that a sequence of the data packets of the second protocol layer is established. It is essential to understand that a data packet of the second protocol layer does not contain the data of two different data packets of the first protocol layer. This technical feature is expressed in the dividing step of Claim 1, as amended, by the language "wherein a data packet of the second protocol layer contains data from only one data packet of the first protocol layer." The data packets of the second protocol layer are numbered without distinguishing between the different data flows, as this is commonly performed in the prior art.

At the receiver side the data packets of the second protocol layer are sorted at the receiver only according to the sequence number of the second protocol layer. At this stage it is not possible to distinguish between the different data flows because a data

packet of the second protocol layer does not include any special information about the associated data flow. For the determination of the data flow, packets of the first protocol layer have to be reassembled from the data packets of the second protocol layer. For this purpose the data packets of the second protocol layer are examined on the second protocol layer, in order to determine whether these data packets contain separators of the first protocol layer. From this information it is possible to recognise whether a data packet of the first protocol layer has been received completely. After the reassembling procedure has been finished, the protocol of the second protocol layer uses the information included in the header of the reassembled, or completely generated data packets of the first protocol layer to determine a data flow, as taught in the application at page 9, lines 31-32. The determination of the different data flows is made on the basis of information added on different layers, as taught at page 14, lines 21-32 and page 15, line 1-8. This technical feature is disclosed in the examining and releasing step of amended Claim 1, by the language "upon a data packet of the first protocol layer being completely generated" from a group of allocated second layer data packets, the completely generated data packet is examined for an association to a data flow and released to the first protocol layer.

It will be seen that by deriving the association between a completely generated data packet and a data flow from already existing information, as is taught by the invention, no special or additional information needs to be provided to data packets on the transmitter side. Moreover, the invention eliminates the prior art need to accumulate received packets in a buffer, until the transmitted sequence has been reproduced. This

requirement of the prior art is described in the application such as at page 6, lines 26-32. Instead, the invention allows a single received data packet, when it is completely generated, to be released directly to the next higher protocol layer.

As stated above, the benefits and advantages of Applicants' invention are achieved in particular by two procedures or features:

(1) The transmitter, in dividing data of a higher protocol layer, avoids packaging data from different data packets of a higher protocol layer in one data packet of the lower layer.

(2) At the receiver a correspondence between a data packet of a lower or second protocol layer and a data flow is recognized from existing information (such as control information) by investigating such information after a data packet of a higher or first protocol layer has been established completely, on the first protocol.

The above feature (1) is set forth in amended Claim 1 in the dividing step thereof, that is, the step which recites "dividing the data of the first protocol layer into consecutive data packets of the second protocol layer by generating a sequence of data packets with a sequence number, wherein a data packet of the second protocol layer contains data from only one data packet of the first protocol layer." The above feature (2) is set forth in Claim 1 in the examining and releasing step thereof, that is, the step which recites "upon a data packet of the first protocol layer being completely generated from a group of data packets of the second protocol layer allocated to the first protocol layer, examining said completely generated data packet for an association to a data flow, and releasing said completely generated data packet to the first protocol layer." These two steps, in the

combination of Claim 1, are considered to patentably distinguish over the prior art, including the respective cited references.

The Doshi patent describes a way of multiplexing a plurality of higher layer data units or PDUs (data flows) onto a transmission medium, or physical layer, by means of additional protocols (consisting of three layers MOB). For the purpose of distinguishing between the data flows at the receiver side an additional protocol is introduced at the sender that adds additional information to the data packets created by subdividing the data packets of the higher protocol layer. This additional information is stated to be a header/trailer at col. 6, lines 22-27. Further, an additional protocol is introduced at the receiver side to handle the additional overhead of the received data packets. Doshi does not disclose releasing a data packet of the first protocol, generated on the receiver side on the second layer from the received data packets of the first protocol layer, after the generated data packet of the first protocol layer has been examined for the association to a data flow. Therefore, Doshi fails to disclose or suggest the examining and releasing steps of Claim 1.

A way of multiplexing is also described in the Amalfitano patent, such as at col. 2, lines 20-26. There is a converter between a physical and a network layer. The converter receives frames, which are subdivided into subframes. In contract, in the present invention the second layer receives data and not data packets. Therefore, data of the first layer must be checked on the second layer, to recognise the data packets of the first layer in order to pack data of only one data packet of the first protocol layer into any one data packet of the second protocol layer. Amalfitano contains no such teaching.

Amalfitano thus fails to disclose or suggest the dividing step of Claim 1. Moreover, in Amalfitano the converter adds additional information, in particular the sub-channel sequence numbers, to distinguish between the different sub-channels. Further, the sub-frames at the receiver side are at first checked for the sub-channel and after that for the position within the frame. However, in the present invention no additional information is added. At the transmitter the data flows are subdivided into a sequence of data packets of the second protocol layer. At the receiver the data packets of the second protocol layer are only sorted according to the sequence number, and allocated to the data packets of the first protocol layer. After the generation of a data packet of the first protocol layer, the complete data packet is examined for the association to a data flow and released to a first protocol layer, as recited in the examining and releasing step of Claim 1. Therefore, no additional information is needed in order to distinguish the different data flows. In contrast, in Amalfitano the data flows are not considered, only the physical sub-channels. Thus, Amalfitano clearly fails to show or suggest the examining and releasing step of Claim 1.

In considering the Doshi and Amalfitano references further, it is clear that neither discloses or suggests the reordering procedure, that is, the procedure of generating a complete data packet as set forth in Claim 1. Moreover, methods for multiplexing data flows shown by these references are concerned with recognizing data flows multiplexed onto a physical layer. Both documents further teach adding an appropriate field to transmitted information, like an additional header, in order to distinguish the information.

As emphasized above, the claimed invention eliminates the need for such additional information.

The Roobol patent describes the determination of an optimal data block size. For this purpose the data is divided at a data link protocol layer into fixed size protocol data units (PDU) where each fixed size PDU has the same number of bits, col. 3, lines 25-28. The problem of reordering, or generating a complete data packet in Claim 1, is nowhere considered. Thus, Roobol likewise fails to disclose or suggest the examining and releasing step of claim 1.

The Ahmed patent describes *inter alia*, such as at col. 9, lines 4-52, the re-assembling of the RLP data packets at the receiver. However, in this document it is said explicitly, at col. 9, lines 47-51, that a receiver reassembles the subframes into a frame and passes it further. This means the second layer receives a frame and not data which are to be examined, as is done in the present invention. Further, Ahmed is applicable for point-to-point connection, where the sequence of frames is not considered. Its teachings do not work for end-to-end connection, wherein the re-establishment of the frame sequence is to be considered. Ahmed only mentions that the re-assembling of the data packets of the first protocol layer (frames) is carried out at a remote host, col. 9, lines 54-57. Further examination of data packets for an association to a data flow, as recited in Claim 1, is not discussed at all in Ahmed.

In RFC 1663 it is stated that the distribution of the data packets to each physical link is controlled by the Multi-Link Procedure, as is the recovery of sequence in the receiving system (section 5.3, second paragraph). Therefore, this document assumes the

necessity of the recovery of the sequence order. There is no hint for improving the processing time of received data by avoiding the recovery of the transmitted sequence of the data packets, and instead of this to release a data packet of the first protocol layer from the second protocol layer to the first protocol layer after it was completely generated, and without checking if the correct order is re-established. Thus, RFC 1663 in no way suggests the examining and releasing steps of Claim 1. The combination of RFC 1663 and RFC 1547 also does not lead to the present invention. More particularly, such combination nowhere suggests the dividing step of Claim 1, wherein during the segmentation on the second protocol layer the data packets of the first protocol layer are divided, so that any one data packet of the second protocol layer includes only data from one data packet of the first protocol layer. Clearly, the combination does not lead to the solution on the receiver side. Moreover, the combination does not suggest the examining and releasing step of Claim 1, wherein the data packets of the second protocol layer are sorted and associated to the data packet of the first protocol layer, and where a data packet of the first protocol layer is directly released to the first protocol layer after the data packet of the first protocol layer has been completely generated and examined for association to a data flow.

Claims 3-23 respectively depend from Claim 1, and are each considered to distinguish over the art for the same reasons given in support thereof.

Claim 24 is an independent claim directed to substantially the same patentable subject matter as Claim 1, and is considered to distinguish over the art for the same reasons given in support thereof.

Claim 25 depends from Claim 24, and is considered to distinguish over the art for the same reasons given in support thereof.

In view of the foregoing amendments, taken together with the accompanying remarks, the application is now considered to be in condition for allowance. Favorable action is respectfully requested.

Respectfully submitted,

JENKENS & GILCHRIST, P.C.
A Professional Corporation

James O. Skarsten

James O. Skarsten
Attorney for Applicants
Reg. No. 28,346

1445 Ross Avenue, Suite 3200
Dallas, Texas 75202-2799
(214) 855-4482
(214) 855-4300 (Fax)